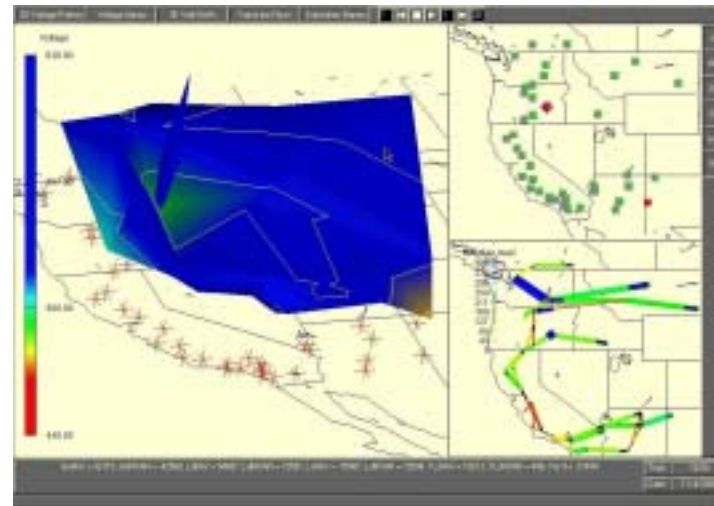


Philip Overholt Transmission Reliability

November 29, 2001
Washington, D.C.



Program Description

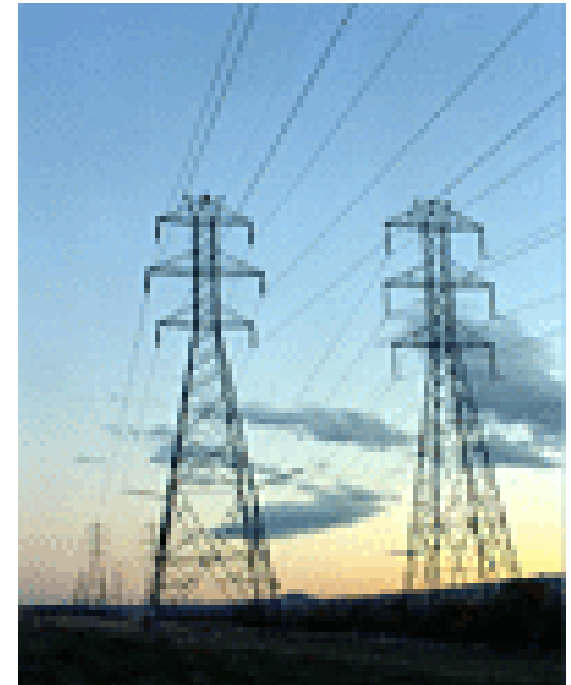


- ▶ Initiated in FY 1999 to fill reliability technology R&D gaps not being addressed by private sector
- ▶ Workshops held to define agenda for R&D under competitive electricity markets
- ▶ Three requirements identified:
 - Information to operate reliable electric system and efficient competitive markets
 - Electric system reliability and markets interlinked
 - Customers need choice for electric energy cost, reliability, and power quality

Goals



- ▶ Develop technologies and policy options that will contribute to maintaining and enhancing the reliability of the nation's electricity delivery system during the transition to competitive markets.
- ▶ By 2010 implement a smart, switchable grid to support electric system reliability and electricity commerce.



- ▶ Real Time Grid Reliability Management
 - Visualization tools that allow display of system conditions
 - Development of real time measurements to detect and mitigate impending outages
- ▶ Reliability and Markets
 - Perform simulation and experiments to examine behavior of proposed market structures
 - Determine value and characteristics of demand response to market prices and system emergencies
- ▶ Distributed Energy Resource Integration
 - Develop microgrid concept to study technical challenges in accommodating large penetrations of DER into the distribution system and power grid

DER Integration



- ▶ Program support of DER mission and goals
 - Focus on technical aspects of large-scale penetration of DG and storage into the grid.
 - Collect real time information on value of DG/storage to support system reliability, and sell into competitive markets.
 - Determine value of load that responds to prices and to system emergencies.
- ▶ The Transmission Reliability program is a DER technology integration activity.
 - Technical integration into a distribution system where grid connected generation has not existed.
 - Economic integration into competitive markets.

Consortium for Electric Reliability Technology Solutions

- ▶ **CERTS members include:**
 - Lawrence Berkeley National Laboratory
 - Electric Power Group
 - Oak Ridge National Laboratory
 - Power Systems Engineering Research Center (**PSERC**)
 - Sandia National Laboratories
 - Pacific Northwest National Laboratory
- ▶ **PSERC members currently performing work for DOE include:**
 - Cornell University
 - University of Illinois at Urbana-Champaign
 - University of Wisconsin-Madison
 - University of California-Berkeley
 - Washington State University
 - Georgia Institute of Technology

Program Implementation

CERTS Match to Research Needs

- ▶ **Multi-disciplinary approach**
 - Engineering, economics, regulatory, institutional
- ▶ **Balance of near and long term R&D**
- ▶ **Independent, third-party analysis**
 - Power Outage Study Team (POST) Report – March 2000
 - National Transmission Grid Study – December 2001



▶ **Development and analysis**

- Powel Grid Management Inc.
- Advanced Visual Systems
- Global Enterprise Management
- Electrotek Concepts
- Sentech

▶ **Demonstrations**

- California Independent System Operator (CAISO)
- California Energy Commission (CEC)
- Bonneville Power Administration (BPA)
- National Rural Electric Cooperative Association (NRECA)
- North American Electric Reliability Council (NERC)
- University of California-Irvine (UCI/SCE)
- American Electric Power – under discussion
- Tennessee Valley Authority (TVA) – under discussion
- New England Independent System Operator (NEISO) – under discussion

▶ **Commercialization**

- Powel Grid Management, Inc. – under discussion

Cross-Cutting Activities



- ▶ California Energy Commission
 - The CEC PIER Program is leveraging Federal funds by supporting work in the program's major activity areas for application in California
 - CEC providing fast track technology transfer for DOE/CERTS developed technologies

Transmission Reliability Program

